

BSC COMPUTER SCIENCE SYLLABUS

Overall Framework

S.No	Semester	Paper/Allied	Title of the paper	Lecture Hours		Max. Marks			Credits
				Th	Pr	Int	Ext	Tot	
1	I Year I Semester	Paper-I	Digital Logic Fundamentals	4		25	75	100	4
2		Practical –I	DigitalLab		3	20	30	50	2
3		Practical-II	Web Design tools		3				
4		Non-Major elective	Tests of Analytical Reasoning I (Verbal)	2		40	60	100	2
5		Soft Skill –I	Essentials of Language and Communication skills	2		40	60	100	3
Total(Major)								150	6
6	I Year II Semester	Paper-II	Object Oriented programming in C++	4		25	75	100	4
7		Practical –II	Web Design tools		3	40	60	100	4
8		Practical-III	C++ ProgrammingLab		3	20	30	50	2
9		Non-Major Elective	Tests of Analytical Reasoning II (Non-Verbal)	2		40	60	100	2
10		Soft Skill – II	Essentials of spoken and presentation skills	2		40	60	100	3
Total (Major)								250	10
11	II Year III Semester	Paper-III	Data structures and Algorithms	5		25	75	100	4
12		Practical –IV	Data structures Lab using C++		3	20	30	50	2
13		Practical-V	Scripting Languages		3				
14		VCES	Environmental Studies	1		25	75	100	2
Total (Major)								150	6
15	II Year IV Semester	Paper –IV	Microprocessors & its Applications	4		25	75	100	4
16		Practical –V	Scripting languages		3	40	60	100	4
17		Practical –VI	Microprocessor lab		3	20	30	50	2
20		Skill Based Elective	Any one from the list	2		40	60	100	3
Total (Major)								250	10

21	III Year V Semester	Paper-V	.Net Programming	5		25	75	100	4
22		Paper-VI	Operating Systems	6		25	75	100	4
23		Paper-VII	RDBMS Using Oracle	5		25	75	100	4
25		Practical – VII	ASP.Net		4	20	30	50	2
26		Practical – VIII	SQL & PL/SQL		4	20	30	50	2
27		Elective – I	Any one from list of electives	6		25	75	100	5
28		YVAE	Value Education(Yoga)			40	60	100	2
Total								500	21
30		Paper-VIII	PHP Programming	4		25	75	100	4
31		Paper-IX	Programming in Java	4		25	75	100	4
32		Practical – IX	PHP Programming		4	20	30	50	2
33		Practical – X	Java Programming		4	20	30	50	2
34		Elective – II	Any one from list of electives	5		25	75	100	5
35		Project	Mini Project	3	3	20	80	100	5
36		Skill Based Elective	Skill based paper	3		40	60	100	3
Total								500	22
Grand Total								1800	75

Core Electives

1. Computer Graphics
2. Resource Management Techniques
3. E-Commerce
4. Cloud Computing
5. Security in Information Technology
6. Computer Networks
7. Software Engineering and testing

Detailed Syllabus

Title of the Course/ Paper	PAPER I: - DIGITAL LOGIC FUNDAMENTALS	
Core	IYear ISemester	Credit: 3
Course outline	Unit-1:	Number Systems & Codes: Number System – Base Conversion – Binary Codes-Code Conversion. Digital Logic: Logic Gates-Truth Tables-Universal Gates.
	Unit-2:	Boolean Algebra: Laws & Theorems –SOP, POS Methods – Simplification of Boolean Functions – Using Theorems, K-Map, Prime – implicant Method-Implementation using Universal gates. Binary Arithmetic: Binary Addition-Subtraction-Variou s Representations of Binary Numbers-Arithmetic Building Blocks-Adders-Subtractors.
	Unit-3:	Combinational Logic: Multiplexers-Demultiplexers-Decoders- Encoders-Code Converters – Parity Generators & Checkers-PAL-PLA.
	Unit-4:	Sequential Logic: RS, JK, D and T Flip-Flops-Edge-Triggered-Master-Slave Flip Flops. Registers: Shift Registers-Types of Shift Registers.
	Unit-5:	Counters: Asynchronous Counters Ripple, Mod, Up-Down Counters- Decoding Gates- Synchronous Counters-Ring, Decade, Presetable, Shift Counters. Memory: Basic Terms & Ideas-Magnetic Memories- Memory Addressing- Types of ROMs-Types of RAMs.
Books for Study	1.	D.P.Leach&A.P.Malvino,Digital Principles and Applications-TMH- Fifth Edition -2002.
	2.	M.MorrisMano,Digital Logic and Computer Design, PHI, 2001.
Books for Reference	1.	T.C. Bartee, Digital Computer Fundamentals, 6 th Edition, Tata McGraw Hill, 1991.
	2.	R.J. Tocci, Digital System Principles and Applications, 8 th Edition.

Title of the Course/ Paper	<i>PRACTICAL I :- DIGITAL LABORATORY</i>	
Practical - I	IYear ISemester	Credit: 2
Exercises	<ol style="list-style-type: none"> 1) Verification of truth table for AND, OR, NOT, NAND, NOR and XOR gates. 2) Realization of NOT, AND, OR, EX-OR gates with only NAND gates. 3) Realization of NOT, AND, OR, EX-OR gates with only NOR gates. <hr/> <ol style="list-style-type: none"> 4) Verification of Associate Law for AND, OR gates. 5) Karnaugh's Map reduction and logic circuit implementation. <hr/> <ol style="list-style-type: none"> 6) Verification of Demorgan's Law. 7) Implementation of Half-Adder and Half-Subtractor. 8) Implementation of Full-Adder and Full Subtractor. 9) Four bit binary Adder. 10) Four bits binary subtractor using 1s and 2s complement. <hr/> <ol style="list-style-type: none"> 11) Implementation of shift Registers, Serial Transfer. 12) Ring Counter. 13) 4-bit binary counters 14) BCD Counter 	

Title of the Course/ Paper	<i>PRACTICAL –II: -Web Design tools</i>	
Practical	I Year I & II Semester	Credit: 4
Exercises	<p data-bbox="443 264 544 297">I HTML</p> <ol data-bbox="496 331 1382 544" style="list-style-type: none"> 1. Create a Web Page for your Personal Information using text formatting tags. 2. Create a web page to display railway train timings using tables. 3. Create a sample web page to promote a product using frames and links, images. 4. Create a form for a questionnaire <p data-bbox="443 551 639 584">II – XML & CSS</p> <ol data-bbox="496 618 1382 1384" style="list-style-type: none"> 1. Create an XML Document to store information about books and create the DTD files 2. Create an XML with child content for invoice description. 3. Create an XML schema for Newspaper Article 4. Create a XML file with DTD for product catalogue 5. Create a DTD For the Resume Xml Document 6. Create an XML document, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document. Write a XML program to store 10 user’s information 7. Design an XML document to store information about a student in our college. The information must include Rollno, Name, Name of the College, Branch, Year of Joining, and e -mail id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document. 8. Create an XSLT style sheet for one student element of the above document (Ques. 7) and use it to create a display of that element. 9. Write an XML which will display the book information. Which includes the following? <div style="margin-left: 40px;"> <p data-bbox="579 1417 1318 1451">Title of Book, Author Name, ISBN Number, Publisher, Edition, Price</p> <p data-bbox="552 1451 1297 1485">a) Write a DTD to validate XML File b) Display XML as follows</p> <ol data-bbox="496 1514 1342 1653" style="list-style-type: none"> 1) The contents should be displayed in a table. The header of table should be in Grey color 2) The author Names column should be displayed in one color & capitalized & should be in bold 3) Use your own colors for remaining columns. Use XSL & CSS for above purpose. </div> 10. Create an XML document whose root is "classlist". This CLASSLIST is created from a starting point of single entity, STUDENT. Any number of students contains elements: firstname, lastname, emailaddress. 	

**Books for
study**

1. Web enabled commercial applications development using Html, DHTML, Javascript, Perl, CGI by Ivan Bayross 3rd revised Ed-BPB

Title of the Course/ Paper	PAPER II :- OBJECT ORIENTED PROGRAMMING WITH C++	
Core	IYear IISemester	Credit: 3
Course outline	Unit-1:	Introduction to C++: Principles Of Object Oriented Programming (Oop) – Software Evolution - Oop Paradigm – Basic Concepts Of Oop, Benefits Of Oop – Applications Of Oop. Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++;
	Unit-2:	Pointers-Functions in C++ - Main Function-Function Prototyping-Parameters Passing in Functions- Values Return by Functions-Inline Functions-Friend and Virtual Functions.
	Unit-3:	Classes and Objects - Constructors and Destructors - Operator Overloading - Type Conversions-Type of Constructors-function overloading. Inheritance: Single Inheritance-Multilevel Inheritance-Multiple Inheritance- Hierarchical Inheritance-Hybrid Inheritance. Pointers, Virtual Functions and Polymorphism; Managing Console I/O operations.
	Unit-4:	Exception handling, Templates and iterators: Introduction – Function templates – Class templates – Container classes – Subclass templates – Passing template classes to template –Iterator classes.
	Unit-5:	Working with Files: Classes for File Stream Operations-Opening and Closing a File -End-of-File Deduction- File Pointers-Updating a File-Error Handling during File Operations-Command line Arguments.
Books For Study	1.	E.Balaguruswamy-Object Oriented Programming With C++-TMH
	2.	Robert Lafore-Object Oriented Programming In Microsoft C++-Galgotia
Books for Reference	1.	K.R.Venugopal –Mastering C++

Title of the Course/ Paper	PRACTICAL III: – C++ PROGRAMMING LAB	
Practical	IYear II Semester	Credit: 2
Exercises	Simple Programs	
	<ol style="list-style-type: none"> 1. Generate the pyramid of digits 2. Generate Armstrong numbers upto a specific limit. 3. Generate Fibonacci series upto n (n<50) number 	
	Functions	
	<ol style="list-style-type: none"> 1. Write a function for a^n (n is an integer) 2. Add the specific no. of distance values using inline function 	
	Classes and objects	
	<ol style="list-style-type: none"> 1. Construct a class for storage of dimensions of circle, triangle and rectangle and calculate their areas. 2. Perform arithmetic operation on complex data using class and object. 3. Enter a date and add or subtract an integer from it depending upon user's choice. 	
	Recursion	
	<ol style="list-style-type: none"> 1. Perform Binary search 2. Reversal of a String 	
Polymorphism		
<ol style="list-style-type: none"> 1. Overload Unary operator 2. Overload Binary operator 3. Overload arithmetic assignment operator 4. Overload operators using friend function 5. Add seconds and time to a specific time value using overloaded functions 		
Inheritance		
<ol style="list-style-type: none"> 1. Illustrate multilevel inheritance 2. Illustrate multiple inheritance 3. Illustrate multiple inheritance (use virtual base class) 		
Virtual and Friend Functions		
<ol style="list-style-type: none"> 1. Illustrate runtime polymorphism 2. Multiply two matrices using a friend function 		
File Handling in C++		
<ol style="list-style-type: none"> 1. Copy a text file to another 2. Create a file of objects and display the objects stored in the file 		

Title of the Course/ Paper	PAPER III-DATASTRUCTURES ANDALGORITHMS	
Core	IIYear IIISemester	Credit: 3
Course outline	Unit-1:	Definition of a Data Structure-Primitive and composite Data Types, Standard Template Library, Performance Analysis and measurement, Arrays, Operations on Arrays, Order lists.
	Unit-2:	Stacks-Application of stacks-Infix to postfix conversion, Recursion, Queues-Operations on Queues, Queue Applications, Circular Queue
	Unit-3:	Singly Linked List-Operations, Applications-Representation of a polynomial, Polynomial addition; Doubly Linked List-Operations.
	Unit-4:	Trees, Binary Trees, Operations-Recursive Tree Traversals. Graphs-Definition, Types of Graphs – Traversal - Hashing Tables and Hashing Functions.
	Unit-5:	Algorithm-Definition-examples-Complexity-divide and conquer-Binary search- Maximum and Minimum-Merge Sort-Quick Sort-Selection sort.

Books for Study:	<ol style="list-style-type: none"> 1. YashvantKanethakar, Data Structures through C++, BPB Publications., 2003. 2. Ellis Horowitz, S. Sahni and S. Rajasekaran - Computer Algorithms - Galgotia Pub. Pvt. Ltd., 1998. 3. P.Sudharsan, J.JohnManoj Kumar, C++ & Data Structures, RBA Publications .,2009
Books for Reference:	<ol style="list-style-type: none"> 1. Schaum's Outline Of Theory And Problems Of Data Structure,LipschutzSeympur 2. E.Horowitz and S. Sahni, Fundamentals of Data Structures in C++, Galgotia Pub. 1999.

Title of the Course/ Paper	<i>PRACTICAL -V - DATA STRUCTURES USING C++ Lab</i>	
Practical	IIYear IIISemester	Credit: 2
Exercises	<ol style="list-style-type: none"> 1. Implement PUSH, POP operations of stack using Arrays. 2. Implement PUSH, POP operations of stack using Pointers. 3. Implement add, delete operations of a queue using Arrays. 4. Implement add, delete operations of a queue using Pointers. 5. Conversions of infix to postfix using stack operations. 6. Postfix Expression Evaluation. 7. Addition of two polynomials using Arrays 8. Addition of two polynomials using Pointers. 9. Creation, Insertion, and Deletion in doubly linked list. 10. Binary tree traversals (in-order,pre-order,and post-order) using recursion. 	

Title of the Course/ Paper	PRACTICAL – VI: - HTML, JAVASCRIPT	
Practical	II Year	III Semester
		Credit: 2
Exercises	<p>I HTML</p> <ol style="list-style-type: none"> 5. Create a Web Page for your Personal Information using text formatting tags. 6. Create a web page to display railway train timings using tables. 7. Create a sample web page to promote a product using frames and links, images. 8. Create a form for a questionnaire <hr/> <p>II – JAVASCRIPT:</p> <ol style="list-style-type: none"> 1. Write a java script program to create HTML tags using document object. 2. Write a java script program to sort the given numbers in ascending and descending order. 3. Write a java script program to find the Factorial of a number using functions. 4. Write a java script program to display largest and smallest numbers from the given list. 5. Write a java script program to display a digital clock. 6. Create a web page to display the text “WELCOME TO COMPUTER SCIENCE” as a heading and change its color from black to white and then to red at an interval of 1000 milliseconds. 7. Create a document and a link to it. When the user moves the mouse over the link, it should load the linked document on its own (user is not required to click on the link) 8. Create a document , which opens a new window without a toolbar, address bar. 9. Create a web page for getting personal details using form controls 10. Write a java script program to design a simple calculator using form fields. Have two fields for input and one field for the output. Allow user to be able to do plus, minus, multiply and divide. 	
Books for study	<ol style="list-style-type: none"> 2. Web enabled commercial applications development using Html, DHTML, Javascript, Perl, CGI by Ivan Bayross 3rd revised Ed-BPB 	

Title of the Course/ Paper	PAPER IV: - MICROPROCESSORS AND ITS APPLICATIONS	
Core	II Year IV Semester	Credit: 3
Course outline	Unit-1:	Introduction to MicroComputers, Microprocessors and assembly Languages- Microprocessor architecture and its operations- 8085 MPU-8085 Instruction Set and classifications.
	Unit-2:	Writing assembly level programs- Programming techniques such as looping, Counting and indexing addressing modes- Data transfer instructions- Arithmetic And logic operations- Dynamic debugging.
	Unit-3:	Counters and Time delays- Hexadecimal counter- Modulo 10 counter- Pulse Timings for flashing lights- Debugging counter and time delay program- Stack- subroutine- conditional call and return instructions.
	Unit-4:	BCD to Binary and Binary to BCD conversions- BCD to HEX and HEX to BCD conversions- ASCII to BCD and BCD to ASCII conversions- BCD to Seven segment LED Code conversions- Binary to ASCII and ASCII to Binary conversions- Multibyte Addition- Multibyte subtraction- BCD Addition- BCD Subtraction- Multiplication and Division.
	Unit-5:	Interrupt- Implementing interrupts- Multiple interrupt- 8085-trap- Problems on implementing 8085 interrupt- DMA- Memory interfaces- Ram & Rom- I/O interface- Direct I/O- Memory mapped I/O.
Books for Study	1.	R.S.Gaonkar, "Microprocessor Architecture, Programming and Applications With 8085/8080", Wiley Eastern Limited, 1990.
	2.	A.Mathur, 'Introduction to Microprocessor', Third Edition, Tata McGraw-Hill Publishing Co.Ltd., 1993.
Books for Reference	1.	V.Vijayendran, 'Fundamentals of Microprocessor (8085)', S. Viswanathan, Printers & Publishers
	2.	Microprocessor (8085) and its Applications - Nagoorkani.A

Title of the Course/ Paper	<i>PRACTICAL VII: –VBA Lab</i>	
Practical	IIYear IVSemester	Credit: 2
Exercises	<ol style="list-style-type: none"> 1. Type a page of Text and record a macro in MS-Word to do the following. <ul style="list-style-type: none"> • Font name – Times New Roman • Font size – 12pt • Font Color – blue • Font style – Bold • Justify text • Adjust line spacing and space before and after. Also make the macro run automatically. 2. The macro recorder makes it very easy to automate certain tasks. <ul style="list-style-type: none"> • delete the contents of columns A and C • move the contents of column B to column A • move the contents of column D to column C 3. Create a macro in Excel that selects the cell that we specify. 4. Write VBA code that modifies the content and appearance of cells and worksheets. 5. Assigning a color to the text in A1, border, background color for selected cells and color to tab of a worksheet. 6. Create, step by step, a macro that retrieves a last name from cell A2, a first name from cell B2, an age from cell C2, and displays them in a dialog box. to display in a dialog box the row from the table that is indicated by the number in cell F5 7. Add a condition to Q.no 6 that will verify that the value of cell F5 is numerical before the code is executed. Modify the program to accept the row number as input from the user. 8. Use the function to count the number of non-empty cells in the first column and use it to display the data in the dialog box 	

Title of the Course/ Paper	<i>PRACTICAL VII: –VBA Lab</i>	
Practical	IIYear IVSemester	Credit: 2
Exercises	<p>9. In a list of student’s data write a program to find the number of passes and failures and also the pass percentage.</p> <p>10. Use select case for the above program.</p> <p>11. Write a program to demonstrate instr, right, left, mid and len string functions using command buttons.</p> <p>12. Write a program to perform an autofill on the cells in the specified range with a series of days of week and months of year. Accept the range from the user and perform an autofill on the range with numbers.</p> <p>13. Write a program to create a 2 dimensional array to store the sales volume of 5 sales persons in two days and display the array in a range of cells.</p> <p>14. Write a program to calculate BMI (Body Mass Index) using functions.</p> <p>15. Write a VBA program to draw a pie and a bar chart, given the data of sales amount in 5 months.</p>	

Web Reference	<p>http://www.excel-pratique.com/en/vba/selections.php</p> <p>http://www.excelvbatutor.com</p>
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Title of the Course/ Paper	PRACTICAL VIII: – XML & CSS	
Practical	IIYear IVSemester	Credit: 2
Exercises	<ol style="list-style-type: none"> 11. Create an XML Document to store information about books and create the DTD files 12. Create an XML with child content for invoice description. 13. Create an XML schema for Newspaper Article 14. Create a XML file with DTD for product catalogue 15. Create a DTD For the Resume Xml Document 16. Create an XML document, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document. Write a XML program to store 10 user's information 17. Design an XML document to store information about a student in our college. The information must include Rollno, Name, Name of the College, Branch, Year of Joining, and e-mail id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document. 18. Create an XSLT style sheet for one student element of the above document (Ques. 7) and use it to create a display of that element. 19. Write an XML which will display the book information. Which includes the following? Title of Book, Author Name, ISBN Number, Publisher, Edition, Price a) Write a DTD to validate XML File b) Display XML as follows 1) The contents should be displayed in a table. The header of table should be in Grey color 2) The author Names column should be displayed in one color & capitalized & should be in bold 3) Use your own colors for remaining columns. Use XSL & CSS for above purpose. 20. Create an XML document whose root is "classlist". This CLASSLIST is created from a starting point of single entity, STUDENT. Any number of students contains elements: firstname, lastname, emailaddress. 	

Title of the Course/ Paper	PAPER V: - .NET PROGRAMMING	
Core	III Year V Semester	Credit: 3
Course outline	Unit-1:	An introduction to ASP.NET web programming – An introduction to web applications, an introduction to ASP.NET application development, Quick preview of how an ASP.NET application works. Introduction to HTML, How to code HTML documents, Basic skills for using CSS, Visual studio features for working with CSS.
	Unit-2:	Introduction to server controls, How to work with button controls, text boxes, labels, check boxes, radio buttons, list controls and other web server controls like image, hyperlink, file upload, and calendar controls. Introduction to validation controls, basic validation controls, validation techniques and advanced validation controls.
	Unit-3:	How to manage state- how to use view state, session state and application state. How to use cookies. An introduction to database programming – introduction to relational databases, how to use SQL to work with the data in databases, introduction to ADO.NET 4, introduction to ADO.NET 4 classes.
	Unit-4:	How to use SQL data sources – how to create a data source, how to use custom statements and stored procedures, DataList control, Data binding, advanced features of a SQL data source. Customize the GridView control, update GridView data, DetailsView control, update DetailsView data, FormView control, ListView control and update ListView data.
	Unit-5:	Introduction to SSL, How to get and use a digital secure certificate, how to use a secure connection. Introduction to authentication, how to set up authentication and authorization, how to use login controls. How to configure an ASP.NET application, how to deploy an ASP.NET application.

Books for Study	1.	Anne Boehm , Murach's ASP.NET 4 web programming with VB 2010, Shroff Publishers and Distributors Pvt. Ltd.
Books for Reference	1.	ImarSpaanjaars , Beginning ASP.NET 4.0 in C# and VB, Wiley Publishers
	2.	Simon Smart , Learn ASP.NET 4.0, C# and VB 2010, published by Smart Method

Title of the Course/ Paper	<i>PAPER VI: - OPERATING SYSTEMS</i>	
Core	III Year V Semester	Credit: 4
Course outline	Unit-1:	Introduction - System structures-operating system services-user operating system interface -system programs-Operating system design and implementation--operating –system structure-Virtual Machines– Process Management- Process scheduling-operations on processes- Interprocess communication -Multithreaded programming-overview-multithreading models- Process scheduling-Basic concepts-scheduling criteria-scheduling algorithms-Multiple-Processor scheduling.
	Unit-2:	Process Synchronization: Critical-Section Problem-Synchronization Hardware- Semaphores-Classical Problems of Synchronization-Critical Region- Deadlocks: Characterization- Methods for Handling Deadlocks- Deadlock Prevention-Avoidance-Detection-Recovery.
	Unit-3:	Memory Management: Address Binding-Dynamic Loading and Linking- Logical and Physical Address Space-swapping-Contiguous Allocation- Internal & External Fragmentation. Non-Contiguous Allocation: Paging- Implementation-Hardware-Protection-Sharing—structure of page table-Segmentation
	Unit-4:	Virtual Memory: Demand Paging-Page Replacement-Page Replacement Algorithms-Thrashing.
	Unit-5:	File System: File Concepts-Access Methods- Directory Structures- Protection Consistency Semantics-File System Structures– Allocation Methods-Free Space Management. System Security : Security Problems – Program Threats –System and Network Threats – User Authentication.

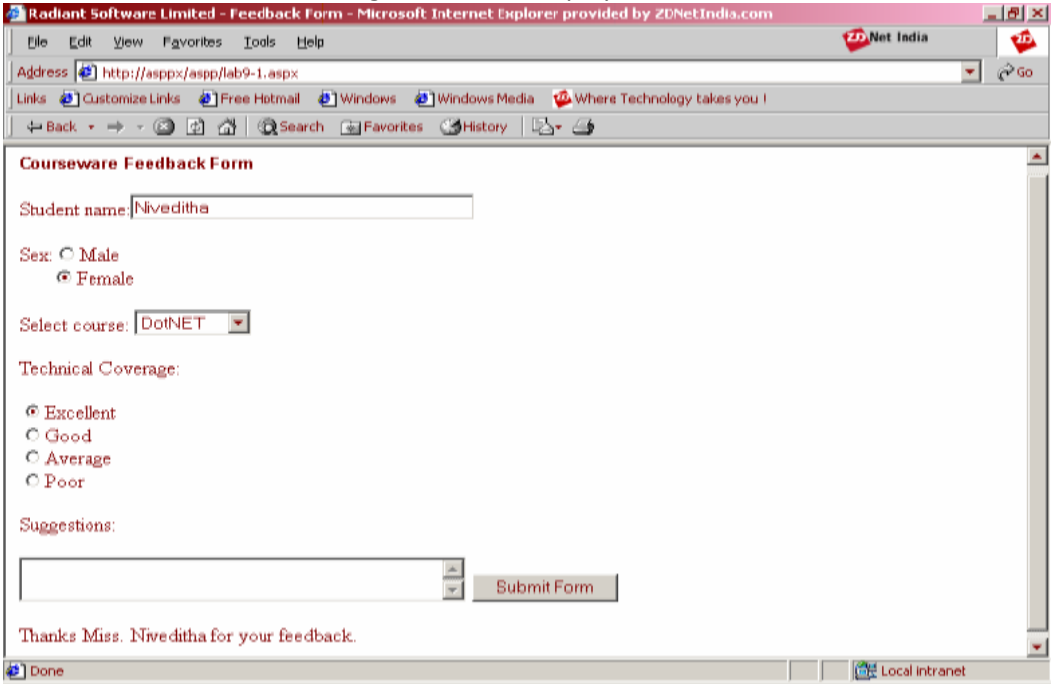
Books for Study:	1.	A.SilberschatzP.B.Galvin,Gange.,“OperatingSystemPrincipless”, 7 th Edn., JohnWiley&Sons.,2002.
Books for Reference:	1.	A.SilberschatzP.B.Galvin,Gange.,“OperatingSystemConcepts”,6 th Edn., JohnWiley&Sons.,2002.
	2.	H.M.Deitel,AnIntroductiontoOperatingSystem, SecondEdition, Addison Wesley,1990

Title of the Course/ Paper	<i>PAPER VII: - RDBMS USING ORACLE</i>	
Core	IIIYear VSemester	Credit: 3
Course outline	Unit-1:	Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and Normalization: Data Modeling – Dependency – Database Design – Normal forms – Dependency Diagrams – De normalization – Examples of Normalization.
	Unit-2:	Oracle9i: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - SQL *Plus. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.
	Unit-3:	Working with Table: Data Management and Retrieval: DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. Functions and Grouping: Built-in functions –Grouping Data. Multiple Tables: Join – Set operations.
	Unit-4:	PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQ L in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.
	Unit-5:	PL/SQL Composite Data Types: Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages –Triggers –Data Dictionary Views.

Books for Study:	1.	Database Systems Using Oracle – Nilesh Shah, 2nd edition, PHI.
Books for Reference:	1.	Database Management Systems – ArunMajumdar&Pritimoy Bhattacharya, 2007, TMH.
	2.	Database Management Systems – Gerald V. Post, 3rd edition, TMH.

Title of the Course/ Paper	<i>Paper-VIII :Software Engineering & Testing</i>	
Core	IIIYear VSemester	Credit: 4
Course outline	Unit-1:	Introduction to Software Engineering: The Software process: A generic view of process-Software Engineering –Layered technology,Processframework,CMMI ,Process patterns , Process assessment , Personal and Team process models ,Process technology and Product&Process. Process models: Waterfall model,Incremental process models,Evolutionarymodels,Specialised Process models,Unified process.-UML.
	Unit-2:	Software Engineering: System engineering –computer based systems,System Engineering hierarchy, business process engineering, Product engineering ,system modeling.Requirements Engineering- Bridge to design and construction,Requirements Engineering tasks,Initiating the requirements engineering process,Eliciting Requirements ,Developing Usecases,Building the analysis model ,Negotiating Requirements and Validating Requirements.
	Unit-3:	Software Engineering: Building the analysis model – Requirement analysis ,Analysis modeling approaches , Data Modeling concepts, Object oriented analysis , Scenario based modeling , Flow oriented modeling ,class based modeling ,Creating Behavioral model. Design Engineering: Design within the context of software Engineering, Design process and design quality,Design concepts , Design model , Pattern Based Software design.
	Unit-4:	Modeling component level design: What is a component, Defining class based components, conducting component level design ,object constraint language,Designing Conventional components. Performing user interface design: Golden rules, user interface analysis and design ,interface analysis ,interface design steps and design evaluation.
	Unit-5:	Testing strategies: A strategic approach to software testing, strategic issues Test strategy for conventional software, testing strategies for object oriented software, validation testing, system testing and art of debugging. Testing tactics: software testing fundamentals, black box testing , White box testing ,Basis path testing , Control structure testing.

Books for Study:	1.	Roger .S. Pressman ,Software Engineering – A Practitioner’s Approach : McGraw – Hill International Edition , Sixth Edition.
	2.	K.K. Aggarwal & Yogesh Singh, Software Engineering, New Age International publishers.
Books for Reference:	1.	Ian Sommerville, Software Engineering-Pearson Education, Asia -3rd Edition
	2.	Software Testing Principles and Practices, Srinivasan Desikan& Ramesh Gopalswamy,Pearson Education
	3.	K.K. Aggarwal & Yogesh Singh, Software Engineering, New Age International publishers.
	4.	Software Engineering-Richard Fairely
	5.	Software Testing Technique-Beizer Boris, Dreamtech

Title of the Course/ Paper	<i>PRACTICAL IX: -ASP . NET LAB</i>	
Practical	III Year V Semester	Credit: 2
Exercises	<p>1. Write a program to display the following feedback form. The different options for the list box must be ASP-XML, DotNET, JavaPro and Unix,C,C++. When the Submit Form button is clicked after entering the data, a message as seen in the last line of the below figure must be displayed.</p>  <p>2. Write a program that displays a button in green color and it should change into yellow when the mouse moves over it.</p> <p>3. Write a program containing the following controls:</p> <ul style="list-style-type: none"> • A ListBox • A Button • An Image • A Label <p>The listbox is used to list items available in a store. When the user clicks on an item in the listbox, its image is displayed in the image control. When the user clicks the button, the cost of the selected item is displayed in the control.</p> <p>4. Extend the above program to add the following controls:</p> <ul style="list-style-type: none"> • Two labels • A TextBox • A Button <p>One of the labels is displayed adjacent to the textbox , displaying the message "Enter the quantity:".When the user enters the quantity in the textbox and clicks the button, the total cost is evaluated and displayed in another label.</p> <p>5. Write a program to get a user input such as the boiling point of water and test it to the appropriate value using CompareValidator.</p>	

Exercises

6. Write a program that gets user input such as the user name, mode of payment, appropriate credit card. After the user enters the appropriate values the Validation button validates the values entered.
7. Create a RadioButtonList that displays the names of some flowers in two columns. Bind a label to the RadioButtonList so that when the user selects an option from the list and clicks on a button, the label displays the flower selected by the user.
8. Create table Employee in master database with the following columns and datatypes.
Dept Numeric
Name Varchar(20)
DojDatetime
Sal Float
Desgin Varchar(20)
Write a program to connect to the master database in SQL Server, in the Page_Load event. When the connection is established, the message "Connection has been established" should be displayed in a label in the form.
9. Select names from the employee table. Retrieve the result in a DataSet. Bind the DataSet to a
RadioButtonList and display the result in three diferent forms as follows:
The RepeatDirection property of the RadioButtonList is set to horizontal and its RepeatLayout property is set to Table.ii) The RepeatDirection property of the RadioButtonList is set to Vertical and its RepeatLayoutproperty is set to Table.iii) The RepeatLayout property of the RadioButtonList is set to flow.
10. Write a program to display the records from the database as shown in the figure:

CustomerID	CustomerName
121	Baskar
122	Partha
123	Suresh
124	Vidya

11. Write a program to implement the sorting feature in the customer table as shown in the figure:

CustomerID	CustomerName
110	Babu
121	Baskar
122	Partha
123	Suresh
109	Swetha
124	Vidya

Title of the Course/ Paper	<i>PRACTICAL X: - SQL & PL/SQL LAB</i>	
Practical	IIIYear VSemester	Credit: 2
Exercises	<p>a) Write queries to create the following tables</p> <ul style="list-style-type: none"> i) EMPLOYEE(employee-name, street, city) ii) WORKS (employee-name, company-name,salary) iii) COMPANY(company-name,city) iv) MANAGERS (employee-name, manager-name) Use insert command to add data according to the need of queries. <p>b) Find the names of all employees who work for a particular company from the following tables.</p> <ul style="list-style-type: none"> i) EMPLOYEE(employee-name, street, city) ii) COMPANY(company-name,city) <p>c) Find the names and city of residence of all employee who work for a particular company from the following tables.</p> <ul style="list-style-type: none"> i) EMPLOYEE(employee-name, street, city) ii) COMPANY(company-name,city) <p>d) Find the names, street address and city of residence of all employees who work for a particular company and earn more than Rs. 2,00,000 per annum. (Nested subquery) from the following tables.</p> <ul style="list-style-type: none"> i) EMPLOYEE(employee-name, street, city) ii) WORKS (employee-name, company-name,salary) iii) COMPANY(company-name,city) <p>e) Find the names of employees who are living in a particular city for a particular company (use group by)</p> <ul style="list-style-type: none"> i) EMPLOYEE(employee-name, street, city) ii) WORKS (employee-name, company-name,salary) iii) COMPANY(company-name,city) <p>f) Find the names of the employees whose salary is greater than the average salary of the particular company (subquery)</p> <ul style="list-style-type: none"> i) EMPLOYEE(employee-name, street, city) ii) WORKS (employee-name, company-name,salary) 	

- g) Find the total and average salary of each company employees
 - i) EMPLOYEE(employee-name, street, city)
 - ii) WORKS (employee-name, company-name,salary)

- h) Find the names of all the employees whose pay is greater than the average pay of their respective company
 - i) EMPLOYEE(employee-name, street, city)
 - ii) WORKS (employee-name, company-name,salary)

- i) Find the names of the employee and the city they work under a particular manager.
 - i) EMPLOYEE(employee-name, street, city)
 - ii) WORKS (employee-name, company-name,salary)
 - iii) MANAGERS (employee-name, manager-name)

- j) Update the name of an employee who has changed his company. Make proper changes in the following tables.
 - i) EMPLOYEE(employee-name, street, city)
 - ii) WORKS (employee-name, company-name,salary)
 - iii) COMPANY(company-name,city)
 - iv) MANAGERS (employee-name, manager-name)

PL/SQL block

1. Write a PL/SQL program to insert ten values in a table, check each value is odd or even and insert the output into the table
2. Use a cursor to select the five highest paid employees from the emp table.
3. Create a master and a transaction table. Write a PL/SQL code to update the master using transaction table.
4. Create a package, which consists of two procedures named hire_employee which will insert new employee details into emp table and another procedure named fire_employee which will delete an employee details from the database.
5. Write a PL/SQL block that will select all rows from a employee table. The block displays empno, empname, doj, dept, and experience column. Experience column should be calculated using current date and doj column.
6. Write a PL/SQL block to select only those rows where the ordered is 2000 from the item table and update the price to be three times the quantity and set the actual price column of the table to the value in price.

	<p>Procedures</p> <ol style="list-style-type: none"> 1. Create a procedure to calculate simple interest. Principal, rate of interest and no. of years are given as input. 2. Create a procedure to satisfy the following conditions accepting the route id as user input. Create suitable table(s). <ol style="list-style-type: none"> a. If the distance is less than 500 then update the fare to be 190.98 b. If the distance is between 501-1000 then update fare to be 876.98 c. If the distance is greater than 1000 then update fare to be 1200.98 <p>Functions</p> <ol style="list-style-type: none"> 1. Create a function that returns the empno of employees working in admin dept. 2. Create a function that finds out the result of a given student rollno.
	<p>Triggers</p> <ol style="list-style-type: none"> 1. Write a database trigger before insert/update/delete for each row and allowing any of the transactions on Mondays, Wednesdays and Fridays. Create suitable table(s) 2. The price of a product changes constantly. It is important to maintain the history of the prices of the products. Create a trigger to update the "Product_price_history" table when the price of the product is updated in the "Product" table. Create the "Product" table and "Product_price_history" table with the following fields respectively <ol style="list-style-type: none"> a. Product_price_history (product_id number(5), product_name varchar2(32), supplier_name varchar2(32), unit_price number(7,2)) b. Product (product_id number(5), product_name varchar2(32), supplier_name varchar2(32), unit_price number(7,2)) 3. Create the Price_history_trigger and execute it. 4. Update the price of a product. Once the update query is executed, the trigger fires and should update the 'Product_price_history' table. 5. Generate a report for railway seat reservations. Check the validity of each field and generate reports for reservation and cancellation details.

Title of the Course/ Paper	<i>PAPER IX: - COMPUTER NETWORKS</i>	
Core	III Year VI Semester	Credit: 4
Course outline	Unit-1:	Introduction - Network Hardware – Software - Reference Models – Internet – ATM - Physical layer - Transmission media - wireless transmission – switching (circuit switching, packet switching, hybrid switching) methods – Communication Satellites.
	Unit-2:	Data link layer Design issues – error detection and correction – elementary data link protocols – Sliding window protocols – Data link Layer in the Internet.
	Unit-3:	Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Ethernet – Ethernet Cabling- Manchester Encoding-Ethernet MAC Sublayer Protocol - Wireless LANs.
	Unit-4:	Network layer – design issues – Routing algorithms – Congestion control algorithms – Internet Working – IP protocol – IP Address – Internet Control Protocol.
	Unit-5:	Transport layer – Elements of Transport Protocols – Addressing, Establishing & Releasing A connection – Internet Transport Protocol (TCP) – The application layer-DNS-The domain name system-Electronic mail-the– Cryptography.

Books for Study:	1.	Andrew S.Tannenbaum , Computer Networks , Fourth Edition , - Pearson Education , Inc,(Prentice hall of India Ltd) 2003.
Books for Reference:	1.	Behrouz Forouzan – Introduction to Data Communications in Networking, TMH – 1999.
	2.	Fred Halsall , Data Communications , Computer Networks and Open Systems , Addison Wesley.
	3.	D.Bertsekas and R.Gallager , Data Networks , Prentice hall,1992.

Title of the Course/ Paper	<i>Paper X :- Programming in PHP</i>	
Core	III Year VI Semester	Credit: 3
Course outline	Unit-1:	Essential PHP: Mixing HTML and PHP- comments – variables. Operators and flow control: Assignment operators- incrementing and decrementing values-string, bitwise, execution operators- operator precedence-relational, logical operators- if, if-else, elseif statement, ternary operator, switch statement-for loops-while loops- do-while loops, foreach loop.
	Unit-2:	Strings and Arrays: string functions-converting to and from strings-formatting. Arrays-modify, delete- handling arrays with loops- array functions-implode-explode functions-extracting data from array-sorting arrays-array operators-multidimensional arrays. Functions: creating- passing & returning data in arrays-passing arrays and returning arrays from functions-pass by reference- using default arguments-returning references, Lists. Variable scope-global data-static variables, conditional functions-variable functions-nesting functions- creating include files- returning errors from functions.
	Unit-3:	Reading data in web pages: Setting up web pages to communicate with PHP-handling text field, text areas, check boxes, radio buttons, list boxes, password controls, hidden controls, image maps, file uploads, buttons.
	Unit-4:	Object oriented Programming: classes-objects-constructors- destructors-overriding methods-overloading methods- autoloading classes. File handling: fopen-feof –fgets-fclose-fgetc. Use of file-get-contents, file-put-contents, reading and writing a file into and from an array- use of file-exists, filesize
	Unit-5:	working with database- basic SQL commands- creating MySQL database-table-insert-delete-update table. Sessions, Cookies : Setting , reading, deleting cookies, simple email creation and Sending , Storing data in sessions. Ajax: Getting started with Ajax-writing Ajax- creating and opening XMLHttpRequest Object-Handling downloaded data, starting the download-Ajax with PHP-Passing data to the server with GET and POST.
Books for Study:	1.	PHP: The complete Reference- “Steven Holzner”- TMH publication- 2011
Books for Reference:	1.	Beginning PHP and MySQL 5: From Novice to Professional, W. Jason Gilmore, Second Edition, Apress publication
	2.	PHP in a Nutshell- Paul Hudson, O'Reilly Media, 2005

Title of the Course/ Paper	<i>PAPER XI: - PROGRAMMING IN JAVA</i>	
Core	III Year VI Semester	Credit: 3
Course outline	Unit-1:	Introduction to Java-Features of Java-Object Oriented Concepts- Lexical Issues- data Types- Variables-Arrays-Operators-control Statements.
	Unit-2:	Classes–Objects-Constructors-Overloading method-Access Control- Static and final methods- Inner Classes-String Class-Inheritance- Overriding methods-Using super Abstract class.
	Unit-3:	Packages-Access Protection-Importing Packages-Interfaces- Exception Handling Throw and Throws-Thread-Synchronization- Messaging- Runnable Interface- Interthread Communication-Deadlock- Suspending, Resuming and stopping threads-Multithreading.
	Unit-4:	I/O Streams-File Streams-Applets-String Objects-String Buffer-Char Array- Java Utilities -Code Documentation.
	Unit-5:	Working with windows using AWT Classes-AWT Controls-Labels- Button-CheckBox-RadioButton-Choice-List-Scrollbars-Layout Managers –Flow Layout-Border Layout-Grid Layout-Card Layout-Grid bag Layout- panels-Frames-Menus-Dialogs-Mouse Events and their Listeners.

Books for Study:	1.	Cay S. Horstmann, Gary Cornell-Paper Java 2 Volume I-Fundamentals, 5 th Edition. PHI, 2000.
	2.	P. Naughton and H. Schildt-Java 2(The Complete Reference)-Third Edition TMH 1999.
	3.	K. Arnold and J. Gosling-The Java Programming Language-Second Edition Addison Wesley, 1996.
Books for Reference:	1.	Programming With Java, A Primer – E..Balaguruswamy
	2.	Programming in Java – C.Muthu

Title of the Course/ Paper	<i>PRACTICALXI:-PHP Programming Lab</i>	
Practical	IIIYear VISEmester	Credit: 2
Exercises	<ol style="list-style-type: none"> 1. Write a program in PHP to display date, month and year in a neat format. 2. Write a program in PHP to change background color based on day of the week using if else, else if statements and using arrays 3. Write a program in PHP to force the text in a string to be all upper or lowercase 4. Write a program in PHP which writes the given number in words 5. Write a simple program in PHP for i) generating Prime number ii) generate Fibonacci series 6. Write a simple program in PHP to manipulate array values. 7. Write a program in PHP for processing a simple form (use controls like checkbox, radio buttons and options). 8. Write a function in PHP to generate random password 9. Write a program for a simple and fast calendar combining PHP and tables. 10. Write a program in PHP for a simple POST and GET functions. 11. Write a program in PHP for setting and retrieving a cookie 12. Write a program in PHP for exception handling for i) divide by zero ii) checking date format 13. Write a program in PHP for random text link advertising using predefined arrays 14. Write a program in PHP for a simple email processing 15. Write a program for PHP for a login script 	

	<p>16. Write a program in PHP for counting lines, number of characters with space and without space from a file</p> <p>17. Write a program in PHP to upload file using form control.</p> <p>18. Write a program in PHP for storing, retrieving and deleting session data</p> <p>19. Write a program in PHP for admin interface to add and delete users using MySQL</p> <p>20. Write a program in PHP to add, update and delete using student database.</p>
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Title of the Course/ Paper	<i>PRACTICAL XII: -JAVA PROGRAMMING LAB</i>	
Practical	IIIYear VI Semester	Credit: 2
Exercises	<p data-bbox="459 409 646 443">Applications</p> <ol data-bbox="662 450 1252 981" style="list-style-type: none"> 1. Area and perimeter of the circle 2. Substring removal 3. Program for overloading functions in java 4. Hierarchical inheritance in java 5. Program for overriding 6. Program for abstract class 7. Program for interface. 8. Program for pre-defined exception handling 9. Program for user-defined exception handling 10. Thread and exceptional handling 11. Thread synchronization 12. Program for Inter Thread Communication 13. Program for java utility (calendar class) 14. Program for string manipulation. 15. File streams <hr data-bbox="448 1008 1380 1010"/> <p data-bbox="459 1037 582 1070">Applets</p> <ol data-bbox="662 1077 1189 1249" style="list-style-type: none"> 16. Program for applet with mouse listener 17. Frames and controls 18. Menus and dialog box 19. Panel and layout 20. Incorporating graphics 	

[Back](#)

Title of the Course/ Paper	<i>PROJECT: - MINIPROJECT</i>	
Elective - III	IIIYear VI Semester	Credit: 5
Group Projects		
<u>Project Evaluation:</u> Power point presentation of the project and individual viva		

DEPARTMENT OF COMPUTER SCIENCE

FIRST SEMESTER

NON MAJOR ELECTIVE FOR OTHER DEPARTMENTS (2 hrs/week)

Objective:

1. To train the students in attending various competitive exams
2. To improve the mental and reasoning ability
3. To enhance logical thinking of the students

Title of the Course/ Paper	<i>Tests of Analytical Reasoning I (Verbal) [From 2013-16 Batch onwards]</i>	
Non major Elective	IYear ISemester	Credit: 2
Course outline	Unit-1:	Questions relating to analogy test, classification, coding and de-coding, classification of ranks
	Unit-2:	Logic based Venn diagrams, Logical alphabet, number and time sequence test.
	Unit-3:	Logical arrangement of words, Blood relations, Letter series

Books for Study:	1.	B.S.Sijwali, InduSijwali – A new approach to reasoning, verbal and non-verbal, Arihant Publications Pvt. Ltd.
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DEPARTMENT OF COMPUTER SCIENCE

SECOND SEMESTER

NON MAJOR ELECTIVE FOR OTHER DEPARTMENTS (2 hrs/week)

Objective:

1. To train the students in attending various competitive exams
2. To improve the mental and reasoning ability
3. To enhance logical thinking of the students

Title of the Course/ Paper	<i>Tests of Analytical Reasoning II (Non Verbal) [From 2013-16 Batch onwards]</i>	
Non major Elective	IYear II Semester	Credit: 2
Course outline	Unit-1:	Questions relating to Completion of series, Counting of figures
	Unit-2:	Embedded figure, Analogy
	Unit-3:	Classification of figures

Books for Study:	1.	B.S.Sijwali, InduSijwali – A new approach to reasoning, verbal and non-verbal, Arihant Publications Pvt. Ltd.
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NON MAJOR ELECTIVE EVENING COLLEGE

Title of the Course/ Paper	<i>NON MAJOR ELECTIVE: FUNDAMENTALS OF DATABASE CONCEPTS</i>	
Non Major Elective	I Year I Semester	Credit: 2
Course outline	Unit-1:	Introduction: File System-DBMS-database system applications- Database system versus file system-Entity-database language
	Unit-2:	Introduction-Starting Access-Using the Database Templates- Creating a Database-Setting a Primary Key-Relationships between Tables-Enforcing Referential integrity-Creating Forms
	Unit-3:	Creating Queries-Using queries to calculate values-Creating an update query-Creating a crosstab query. Creating Reports, Sample application.

Books for Study:	1.	"Microsoft Office Access 2007"-Curtis D.Frye
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NON MAJOR ELECTIVE EVENING COLLEGE

Title of the Course/ Paper	<i>NON MAJOR ELECTIVE: BASICS IN QUERY LANGUAGE</i>		
Non Major Elective	I Year	II Semester	Credit: 2
Course outline	Unit-1:	SQL Introduction: SQL Language-Role of SQL-SQL Features and Benefits DDL-DML-TCL. SQL Basic: Statements-Names-Data types-Constants-Expressions-Built-in- functions.	
	Unit-2:	Simple Queries: Select-Where-Insert-Update-Delete -SQL Order By-AND- OR-IN-BETWEEN-Aliases-Union-Create-Drop-Alter-Aggregate Functions-Date Functions-Group By-Select into-Create View-Drop View.	
	Unit-3:	Sub Queries: Nested Sub queries-Correlated sub queries-Sub queries in the having clause. Joins: Simple Join-Non Equi join-Inner join-Outer join.	

Books for Study:	1.	LEROY, NIRVA MORISSEAV SOLOMON, MARPLAISIR GERALD,P – Oracle 9i SQL programming.
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Detailed Elective Syllabus

Title of the Course/ Paper	<i>ELECTIVE :-COMPUTER GRAPHICS</i>	
Elective	III Year	V/VI Semester
		Credit: 5
Course outline	Unit-1:	Introduction to computer graphics: Brief Survey of Computer Graphics – Graphics Systems: Video Display Devices – Types – Raster-Scan Systems and Random-Scan Systems – Input Devices – Hard-Copy Devices – Graphics Software.
	Unit-2:	Output primitives and their attributes Line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm – Ellipse-Generating (Midpoint) Algorithms- Area-Filling (Boundary-Fill and Flood-Fill) Algorithms - Line Attributes - Color and Grayscale Levels – Character Attributes.
	Unit-3:	Two-dimensional transformations and viewing : Basic Transformations - Matrix Representations and Homogeneous Coordinates – Composite Transformations - Other Transformations – Window-to- Viewport Coordinate Transformation.
	Unit-4:	Three-dimensional concepts: Three-Dimensional Display Methods: Parallel and Perspective Projections – Depth Cueing - Visible Line and Surface Identification –Three-Dimensional Transformations: Translation- Rotation- Scaling - Other Transformations.
	Unit-5:	Three-dimensional viewing: Viewing Pipeline and Coordinates – Transformation from World to Viewing Coordinates – Projections – Parallel Projection- Perspective Projection.

Books for Study:	1.	D. Hearn and M.P. Baker, 2005, Computer Graphics, 2nd Edition, Pearson Education, Prentice Hall, 19th Reprint.
Books for Reference:	1.	S. Harrington, 1987, Computer Graphics , 2nd Edition , Tata McGraw-Hill Book Co.
	2.	W.M. Newman and R.F. Sproull , 1997, Principles of Interactive Computer Graphics, 2nd Edition, Tata McGraw-Hill Publishing Co. Ltd.
	3.	D.P. Mukherjee, 1999, Fundamentals of Computer Graphics and Multimedia , 1 st Edition, Prentice-Hall of India Pvt. Ltd.

Title of the Course/ Paper	<i>ELECTIVE :-RESOURCE MANAGEMENT TECHNIQUES</i>	
Elective	III Year	V/VI Semester
		Credit: 5
Course outline	Unit-1:	Basic of Operations Research (OR): Characteristics of OR-Necessity of OR in industry-OR and Decision making-Role of computers in OR. Linear programming: Formulation and Graphical solution (of 2 variables) canonical and standard terms of Linear programming problem. Algebraic solution and Graphical solution: Simplex method
	Unit-2:	Transportation model: Definition-formulation and solution of transportation models – the row- minima, column-minima, matrix minima and vogel’s approximation methods. Assignment model: Definition of assignment model-comparison with transportation model-formulation and solution of Assignment model-variation of Assignment problem.
	Unit-3:	Sequencing problem: Processing each of n jobs through m machines-processing n jobs through 2 machines-processing n jobs through 3 machines – processing 2 jobs through m machines-processing n jobs through m machines – traveling salesman problem.
	Unit 4:	Game Theory: Characteristic of games – maximin,minimax criteria of optimality – Dominance property – algebraic and graphical method of solution of solving 2*2 games.
	Unit-5:	Pert-CPM: Networks-PERT computation-CPM computation – resource scheduling.

Books for Study:	1.	Operations Research -Resource Management Technique, P.R.Vittal,V.Malini ,Margham Publication.
	2.	HamdyA.Taha: Operation Research – An Introduction, 5thed. Prentice Hall of India, Private Limited.,New Delhi,1996.
Books for Reference:	1.	
	2.	Srinath L.S.: PERT and CPM principles and applications, Affiliated East Press Pvt. Ltd., New York, 1973.

Title of the Course/ Paper	<i>ELECTIVE :-E-COMMERCE.</i>	
Elective	III Year	V/VI Semester
		Credit: 5
Course outline	Unit-1:	Electronic Commerce and Opportunities: Background The Electronic Commerce Environment – Electronic Marketplace Technologies – Modes of Electronic Commerce: Overview: Electronic Data Interchange.
	Unit-2:	Approaches to Safe Electronic Commerce. Overview – Secure Transport Protocols – Secure Transaction – Secure Electronic Payment Protocol (SEPP) – Secure Electronic Transaction (SET)
	Unit-3:	Certificates for Authentication – Security on Web Servers – Payment Schemes: Internet Monetary Payment and Security Requirements- Payment and purchase order process – Online electronic cash.
	Unit-4:	Internet / Intranet Security Issues and Solutions : The Need for Computer Security – Specific Intruder Approaches – Security Strategies-Security Tools – Encryption – Enterprise Networking and Access to the Internet Antivirus Programs.- Security Teams.
	Unit-5:	MasterCard/Visa Secure Electronic Transaction: Introduction – Business Requirements – Concepts – payment Processing.

Books for Study:	1.	Daniel Minoli& Emma Minoli, “Web Commerce Technology Handbook”, Tata McGraw Hill – 1999.
Books for Reference:	1.	K.Bajaj& D Nag , “E-Commerce”, Tata McGraw Hill – 1999.
	2.	MamtaBhusry – “E-Commerce”

Title of the Course/ Paper	<i>ELECTIVE :- CLOUD COMPUTING</i>	
Elective	III Year	V/VI Semester
		Credit: 5
Course outline	Unit-1:	Understanding Cloud Computing: An Introduction to Cloud Computing –Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.
	Unit-2:	VIRTUALIZATION : Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization -Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices -Virtual Clusters and Resource management – Virtualization for Data-center Automation.
	Unit-3:	CLOUD INFRASTRUCTURE :Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.
	Unit 4:	SECURITY IN THE CLOUD :Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security –Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control– Autonomic Security.
	Unit-5:	Outside the Cloud: Other Ways to Collaborate Online: Collaborating via Web-Based Communication Tools - Collaborating via Social Networks and Groupware - Collaborating via Blogs and Wikis.

Books for Study:	1.	George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O'Reilly
	2.	RajkumarBuyya, Christian Vecchiola, S.ThamaraiSelvi, ‘Mastering Cloud Computing”,TMGH,2013.
	3.	BOOKS FOR STUDY: “Cloud Computing” Michael Miller, Pearson publication, 2013
Books for Reference:	1.	Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”, TMH, 2009.
	2.	Kumar Saurabh, “Cloud Computing – insights into New-Era Infrastructure”,Wiley India,2011.

Title of the Course/ Paper	<i>ELECTIVE :-SECURITY IN INFORMATION TECHNOLOGY</i>	
Elective	III Year	V/VI Semester
		Credit: 5
Course outline	Unit-1:	Information Security – Introduction of information security – History, critical characteristic of Information, NSTISSC Security model, Components of an information system, securing components. The need for security – Introduction, Business needs, Treats, Attacks, Malicious code, Hoaxes, Back doors, Password crack, Brute force, Dictionary, DoS, Spoofing, Man-in-the-middle, Spam, Mail Bombing, Sniffers, Social Engineering, Buffer Overflow, Timing Attack.
	Unit-2:	Risk Management – Introduction, overview of risk management, risk identification, risk assessment, risk control strategies, selecting a risk control strategy. Security Policies – Introduction, information security policy, standards and practices, information security blueprint, continuity strategies, introduction to ISO27000 series.
	Unit-3:	Firewall and VPNs - Introduction, Physical design, Firewalls, protecting remote connections. Intrusion Detection, Access control and other tools – Introduction, IDSs, Honey nets and Padded cell systems, Scanning and Analysis tools, Access control devices.
	Unit-4:	Cryptography – Introduction, Principles of Cryptography, Cryptography tools, Public key infrastructure, Digital certificates, Hybrid cryptography systems, Steganography, protocols for secure communication.
	Unit-5:	Information Security Maintenance – Introduction, security management models, maintenance model.
Books for Study	1.	Michael E. Whitman and Herbert J. Mattord , Principles of Information Security, 4 th Edition, Thomson Course Technology, Boston.
Books for Reference	1.	Daswani Neil, Christopher Kern and Anita Kesavan , (2007), Foundations of Security – What every programmer needs to know, Apress, Berkeley CA.

Internal Marks Split

THEORY		PRACTICAL	
Internal 25 and External 75		Internal 40 and External 60	
Internal breakup		Internal breakup	
Components	Weightage (in %)	Components	Weightage (in %)
<ul style="list-style-type: none"> • Seminar • Surprise Objective test • Continuous assessment test I & II • Midsem/model 	5 5 10 5	<ul style="list-style-type: none"> • Model test • Record • Observation 	25 10 5
TOTAL	25	TOTAL	40

THEORY		PRACTICAL	
Internal 15 and External 60		Internal 20 and External 30	
Internal breakup		Internal breakup	
Components	Weightage (in %)	Components	Weightage (in %)
<ul style="list-style-type: none"> • Seminar • Surprise Objective test • Continuous assessment test I & II • Midsem/model 	3 3 6 3	<ul style="list-style-type: none"> • Model test • Record • Observation 	10 5 5
TOTAL	15	TOTAL	20

Question Paper Pattern

Maximum marks 60 and three hour examination:-

Section A (Answer any 10 from 12)	$10 \times 1 = 10$
Section B (Answer any 5 from 7)	$5 \times 4 = 20$
Section C (Answer any 3 from 5)	$3 \times 10 = 30$

Maximum marks 75 and three hour examination:-

Section A (Answer any 10 from 12)	$10 \times 2 = 20$
Section B (Answer any 5 from 7)	$5 \times 5 = 25$
Section C (Answer any 3 from 5)	$3 \times 10 = 30$